

## *Leionema praetermissum* (Rutaceae), a new restricted endemic for New South Wales.

Philippa R. Alvarez and Marco F. Duretto

National Herbarium of New South Wales, Royal Botanic Gardens and Domain Trust,  
Mrs Macquaries Road, Sydney NSW 2000, Australia  
[philippa.alvarez@bgcp.nsw.gov.au](mailto:philippa.alvarez@bgcp.nsw.gov.au); [marco.duretto@rbgsyd.nsw.gov.au](mailto:marco.duretto@rbgsyd.nsw.gov.au)

### Abstract

*Leionema praetermissum* P.R.Alvarez & Duretto (Rutaceae), previously called *L.* sp. Colo River (P.H.Weston 2423), is here formally described. This rare species is found in Wollemi National Park in the Central Coast Region of New South Wales, Australia. We present information on its distribution, conservation status and an updated key to the genus *Leionema* for New South Wales and south-east Queensland.

### Introduction

*Leionema* (F.Muell.) Paul G.Wilson (Rutaceae) is a genus of 28 species – 27 are found in eastern Australia and Tasmania, and *L. nudum* (Hook.) Paul G.Wilson is found in New Zealand (Wilson 2013; Copeland & Telford 2018). New South Wales (NSW) is a centre of diversity for the genus with 17 species, 10 of which, along with two subspecies, are endemic to the state.

In the 1960's M.R. Lemburg collected a plant specimen from Hungryway Creek, near Colo, Central Coast, NSW. This specimen was considered to be an undescribed species by Weston and Porteners (1991) who treated it as *Phebalium* species A (later listed as *Leionema* sp. Colo River (P.H. Weston 2423) on PlantNET). It was thought to be related to *P. elatius* (F.Muell.) Benth. (= *Leionema elatius* (F.Muell.) Paul G.Wilson), but differed primarily in the narrower leaves. Wilson (1998 p. 273) raised the possibility that *Phebalium* species A may be of hybrid origin as it had deformed and sterile flowers, but did not suggest likely parents and acknowledged that the species it mostly closely resembled, *L. elatius*, was not found in the Colo area. After the initial gathering, the species was collected again only in the 2000s, with subsequent fruiting collections indicating that it is not sterile. It has been treated under a number of informal names (see synonymy below). The species was included in the *Flora of New South Wales* (Weston & Porteners 1991; Weston & Harden 2002; PlantNET 2019) and the Australian Plant Census (2019) but was not included in the *Flora of Australia* (Wilson 2013) besides a mention as a note under *L. elatius*. Based on morphology, the species may be most closely related to *L. elatius* (NE NSW, SE Qld) and *L. obtusifolium* (Paul G.Wilson) Paul G.Wilson (SE Qld), but is geographically isolated from both these species. It can be distinguished from these, and other species, by a number of stem, leaf, and inflorescence characteristics, supporting the hypothesis that the Colo River plants comprise a reproductively isolated and morphologically distinct species. This species is here formally described as *Leionema praetermissum* P.R.Alvarez & Duretto.

## Material and methods

Specimens at the National Herbarium of New South Wales (NSW) of the new species and those to which it was considered to be most nearly related were examined and distinguishing features measured and documented. Type specimens of various *Leionema* species were viewed online at JSTOR Global Plants to confirm correct application of species names (<https://plants.jstor.org>).

## Taxonomy

*Leionema praetermissum* P.R. Alvarez & Duretto, *sp. nov.*

**Diagnosis:** Differs from *Leionema obtusifolium* by having leaves that are linear-oblongate and up to 35 mm long (versus narrowly elliptic to narrowly oblong and up to 50 mm long), stems that are terete (versus distinctly angled) and an inflorescence of 3–10 flowers (versus an inflorescence of 10–20 flowers); and from *L. elatius* by having linear-oblongate leaves that are 2–3 mm wide (versus spatulate, oblongate, obovate or narrowly oblong, and 3–10 mm wide).

**Type:** AUSTRALIA: New South Wales: Central Coast: Wollemi National Park, 8 May 2000, P.H. Weston 2423 & A.N. Rodd (holotype: NSW 439899; isotypes: AD, BRI, CANB, DNA, HO, K, MEL, MO, NBG, PERTH) precise locality details withheld.

= *Phebalium* species A, Weston & Porteners, *Flora of New South Wales* vol. 2: 261 (1991).

= *Leionema* sp. 'Colo River' (Weston 2423), Weston & Harden, *Flora of New South Wales* Vol. 2 (revised): 308 (2002).

= *Leionema* sp. Hungryway Creek (Lemberg NSW 69237) (see APC 2019)

= *Leionema* sp. Colo River (P.H. Weston 2423) NSW Herbarium (see APC 2019).

**Etymology:** The epithet is derived from the Latin *praetermissa* (missed out, overlooked, neglected) and refers to this species having been identified as an undescribed taxon for at least three decades before being formally described, a situation not uncommon in Australia due to the limited number of specialists available to conduct critical research on the discovery and documentation of biodiversity.

*Shrub* to 2 m tall, with few to many stems branching from the base. *Stems* glandular-warty, terete. *Leaves* simple, alternate but sometimes congested and appearing whorled, glabrous, subsessile or with petiole to 2 mm long; lamina linear-oblongate, 20–35 mm long, 2–3 mm wide, with obvious glands though not verrucose, base attenuate, apex acute, margins slightly recurved. *Inflorescences* terminal and axillary in upper leaf axils, a cyme of 3–10 flowers; pedicel 5–10 mm long. Flowers 5-merous. *Calyx* green, 1–2 mm long, glabrous or ciliate. *Petals* 4–5 mm long, spreading, glabrous, adaxial surface white, abaxial surface pale green. *Stamens* 10; filaments white, up to 6 mm long, slightly longer than corolla; anthers cream. *Carpels* 5; ovary and style 3–6 mm long; style twisted. *Cocci* glabrous, 3–4 mm long, 2–3 mm wide. *Seed* ellipsoid, black to dark brown, c. 3 mm long, c. 2 mm wide, smooth, shiny (Figs 1–3).

**Distribution:** *Leionema praetermissum* is apparently restricted to the catchment of the Colo River in Wollemi National Park, NSW, approximately 70 km west of Gosford.

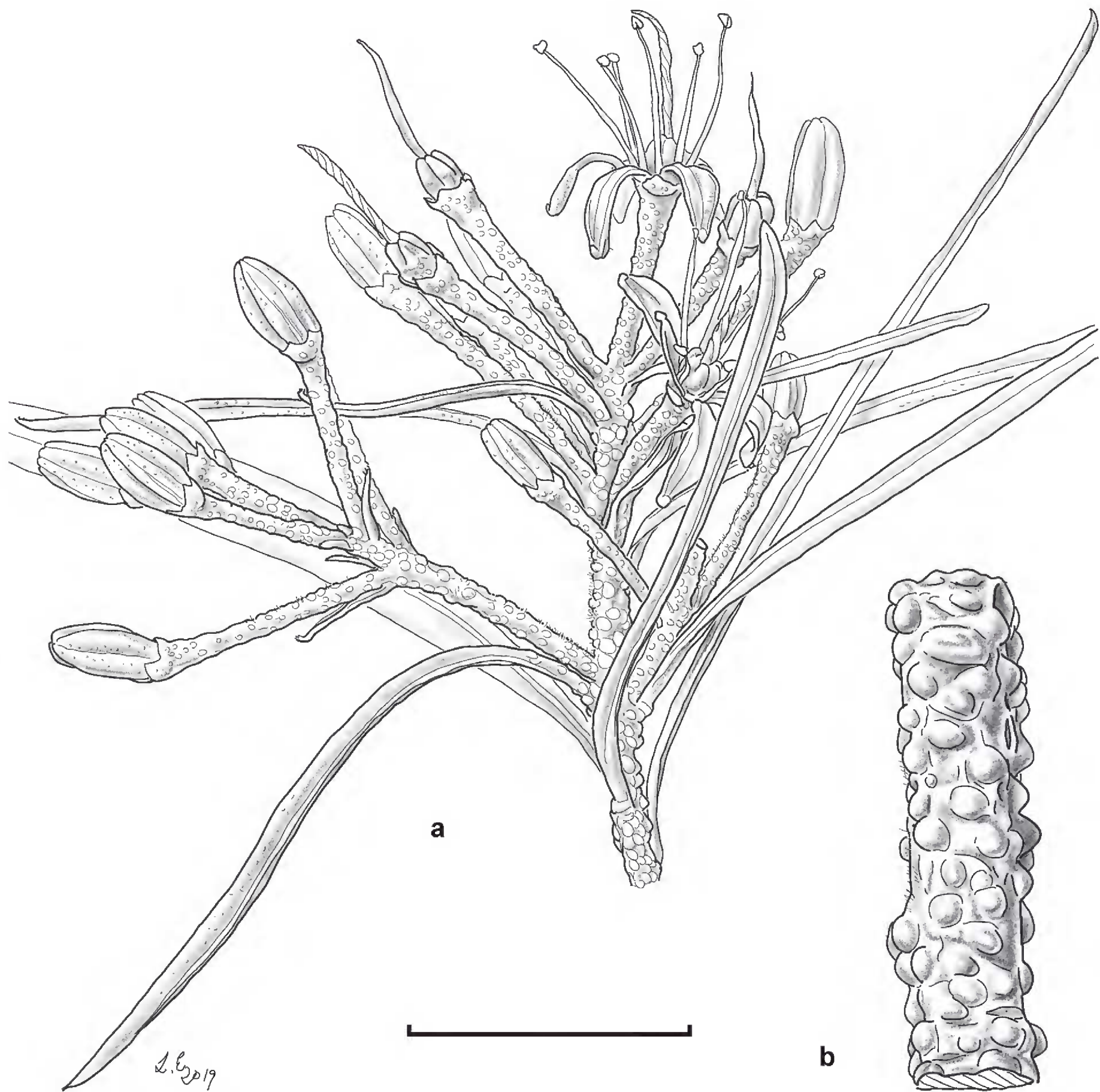
**Habitat:** *Leionema praetermissum* grows in and near the riparian zone in sand amongst sandstone boulders, in thickets dominated by *Tristanopsis laurina* and/or *Backhousia myrtifolia* and a variety of other species including *Casuarina cunninghamii*, *Stenocarpus salignus* and *Lomatia myricoides*. Data associated with some herbarium collections indicate that the species can be locally dominant.

**Phenology:** Flowering material has been collected from April to June, mature fruit has been collected in November.

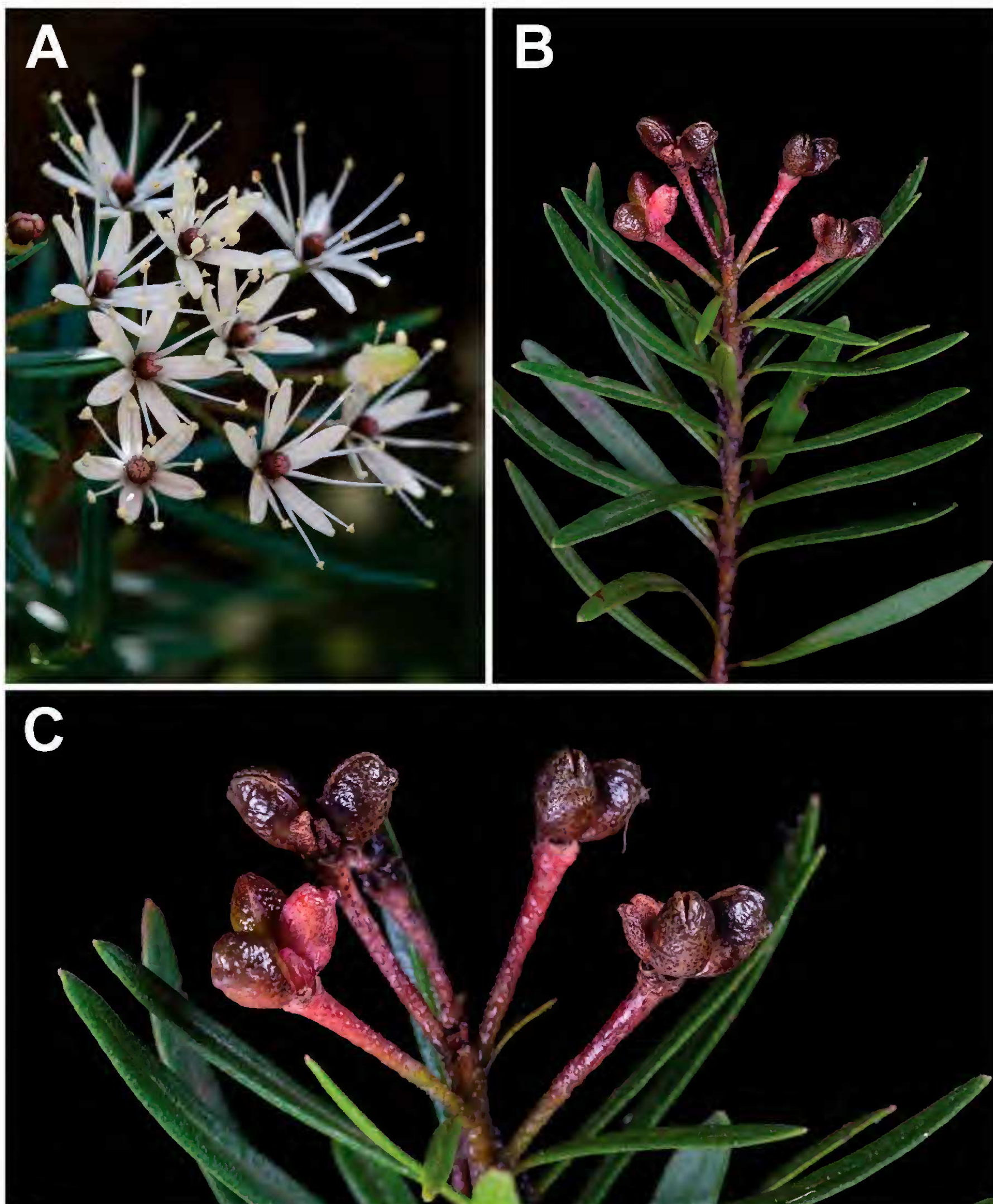
**Conservation status:** *Leionema praetermissum* is not currently listed as a threatened species under Federal or State legislation. It would probably qualify to be formally listed as a threatened species using IUCN (2017) criterion D as it has a restricted geographic distribution and is known from very few populations. Notes with herbarium specimens indicate the species can be locally common and dominate the understory. Additional surveys to ascertain the extent of the species and if there are any threats are highly desirable to allow an accurate conservation assessment to be completed.



**Fig. 1.** *Leionema praetermissum*: a - habit; b – flower, side view; c – flower,  $\frac{3}{4}$  view; d - antesepalous anther, abaxial view; e - antesepalous anther, adaxial view; f - antepetalous anther, adaxial view; g - antepetalous anther, abaxial view; h - calyx, base of stamens and gynoecium detail; i - gynoecium; j - stigma detail. a-j - Weston 2432 & Rodd (NSW). Scale bar = 50 mm for a; 7.5 mm for b & c; 2 mm for d - g & j; 3.3 mm for h & i. Illustration: L. Elkan.



**Fig. 2.** *Leionema praetermissum*: a - inflorescence detail; b - stem detail. a & b - Weston 2432 & Rodd (NSW). Scale bar = 10 mm for a; 5 mm for b. Illustration: L. Elkan.



**Fig. 3.** *Leionema praetermissum*: a– flowering inflorescence; b, c - stem with fruit. a – unvouchered; b & c - *Johnstone 2642 & Errington* (NSW). Photographs: A. Orme, not to scale.

**Additional specimens (precise locality details obfuscated for conservation reasons):** AUSTRALIA: New South Wales: Central Coast: Hungryway Creek, Colo, *M.R.Lemberg s.n.* (NSW 69237); Wollemi National Park, 8 May 2000, *P.H.Weston 2424-2434 & A.N.Rodd* (NSW); *ibid*, 12 Jul 2003, *W.Jones s.n.* (NSW 608488); *ibid*, 10 Sep 2003, *W.Jones s.n.* (CANB *n.v.*, NE *n.v.*, NSW 608488); *ibid*, 30 May 2007, *W.A.Cherry s.n. & A.J.Perkins* (NSW 746248); *ibid*, 4 Nov 2009, *R. Johnstone 2642 & G. Errington* (K *n.v.*, NSW 799248).

**Key to the species of *Leionema* found in New South Wales and south-eastern Queensland, adapted from Copeland and Telford (2018)**

- 1 Petals >7 mm long, erect or spreading; stamens considerably exceeding petals ..... 2
- 1: Petals <6 mm long,  $\pm$  spreading; stamens  $\pm$ equal to or slightly longer than petals ..... 6
- 2 Petals fused ..... *Leionema sympetalum*
- 2: Petals free ..... 3
- 3 Stems  $\pm$  terete ..... 4
- 3: Stems strongly angled ..... 5
- 4 Stems pilose; leaves c. 10 mm long ..... *Leionema carruthersii*
- 4: Stems stellate-tomentose; leaves 20–40 mm long ..... *Leionema viridiflorum*
- 5 Leaf margins entire; inflorescence pendulous ..... *Leionema ralstonii*
- 5: Leaf margins frequently serrulate; inflorescence erect ..... *Leionema scopulinum*
- 6 Leaves 2.5–4 cm wide, base stem-clasping ..... *Leionema ambiens*
- 6: Leaves <2 cm wide, base not stem-clasping ..... 7
- 7 Leaves hairy (including minutely papillose) on abaxial surface ..... 8
- 7: Leaves glabrous on abaxial surface ..... 13
- 8 Inflorescence terminal ..... 9
- 8: Inflorescence axillary ..... 10
- 9 Petals yellow, pale red towards apex on abaxial surface; leaves pilose or coarsely stellate on lower surface; pedicels 1–2 mm long ..... *Leionema diosmium*
- 9: Petals white; leaves pilose on lower surface; pedicels 3–5.5 mm long ..... *Leionema westonii*
- 10 Leaves 2–8 cm long, apex 2-toothed, margins entire to finely toothed; inflorescences >10 mm long, c. 10-flowered ..... *Leionema dentatum*
- 10: Leaves 0.8–2(–3) cm long, apex entire, margins entire; inflorescences usually <10 mm long, 1–3-flowered ..... 11
- 11 Ovary globose, white stellate-pubescent or rarely glabrous; cocci c. 3.5 mm long; leaves smooth on adaxial surface ..... *Leionema phyllicifolium*
- 11: Ovary rostrate, glabrous, pilose or rarely villous; cocci 6 mm long or more; leaves minutely scabridulous on adaxial surface ..... 12
- 12 Inflorescences 3-flowered, rarely some (never all) 1-flowered; leaves straight, mostly 12–21 mm long, abaxial surface visible ..... *Leionema ceratogynum*
- 12: Inflorescences 1-flowered; leaves slightly up-curved, mostly 7–15 mm long, abaxial surfaces mostly obscured by revolute margins ..... *Leionema lachnaeoides*
- 13 Stems strongly angled, glabrous; leaves 3–7 cm long, narrow-elliptic to oblanceolate, margins finely and regularly toothed, apex acute ..... 14
- 13: Stems terete to slightly angled, glabrous or hairy; leaves 0.6–5 cm long, margins usually entire or sometimes minutely erose or crenate ..... 15
- 14 Leaves 50–70 cm long, 10–15 mm wide ..... *Leionema coxii*
- 14: Leaves 25–50 mm long, 3–6 mm wide ..... *Leionema obtusifolium*
- 15 Inflorescences axillary; leaves linear to narrow-oblong or narrow-elliptic, margins recurved to revolute ..... 16
- 15: Inflorescences terminal and often also axillary; leaves linear- to broad-spathulate or  $\pm$  circular, obovate or elliptic, margins flat to recurved ..... 17
- 16 Flowers solitary; stems pilose ..... *Leionema gracile*
- 16: Inflorescence mostly a cluster of 3 or 4 flowers; stems with stellate hairs ..... *Leionema phyllicifolium*

17	Leaves >13 mm long .....	18
17:	Leaves <13 mm long .....	19
18	Leaves spatulate, oblanceolate, obovate or narrowly oblong, 3–10 mm wide .....	<i>Leionema elatius</i>
18:	Leaves linear-oblanceolate, 2–3 mm wide .....	<i>Leionema praetermissum</i>
19	Stems pilose .....	<i>Leionema gracile</i>
19:	Stems with stellate hairs .....	20
20	Stems warty, minutely hairy in longitudinal lines or all over; leaves erect to spreading, not imbricate, 2–4 mm wide .....	<i>Leionema lamprophyllum</i>
20:	Stems not warty, minutely stellate-hairy all over; leaves erect and ± imbricate, 4–6 mm wide .....	<i>Leionema rotundifolium</i>

### Acknowledgements

We would like to thank the Lesley Elkan for both of the excellent line drawings, Andrew Orme for permission to use his photographs in Figure 3, and Peter Weston (NSW) for useful discussions.

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Manuscript received 9 April 2019, accepted 7 May 2019